

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

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Applications of)	
)	
SPACE EXPLORATION HOLDINGS, LLC)	Call Signs: S2983 and S3018
)	
For Modification of Authorization for the)	File No. SAT-MOD-20200417-00037
SpaceX NGSO Satellite System)	
)	
VIASAT, INC.)	Call Sign: S2985
)	
For Modification of the Viasat)	File No. SAT-MPL-20200526-00056
Non-Geostationary Orbit Satellite System)	
Using Ka- and V-Band Frequencies)	
_____)	

**OPPOSITION OF SPACE EXPLORATION HOLDINGS, LLC TO
PETITION PURSUANT TO SECTION 1.1307(c) OF VIASAT, INC.**

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SUMMARY

The Commission has long concluded that satellite authorizations categorically do not have significant environmental effects warranting individualized environmental review, and has never found “extraordinary circumstances” sufficient to override that determination. There is no reason to depart from that precedent here.

- SpaceX’s proposed modification either improves upon or maintains the environmental effects of its currently authorized system in every way. Viasat, in its desperation to mislead the Commission into harming competition, relies on warmed-over and debunked claims as well as material misrepresentations to support a belated Petition that, without irony, *asks the Commission to prevent SpaceX from implementing environment-friendly changes.*
- The very studies Viasat relies upon, as well as analytical software developed by NASA and real-world experience, confirm that SpaceX’s modification would:
 - Decrease the effect of its satellites on astronomy and the night sky
 - Decrease the risk of satellite collisions
 - Decrease the time in orbit of its non-propulsive satellites
 - Cause no change in the number of satellite launches and reentries associated with its constellation.
- SpaceX—not Viasat—has worked extensively at the highest levels with the astronomy community to develop strategies to protect space exploration. SpaceX’s ongoing efforts have set the standard for the industry and revealed important information about how to deploy an environmentally-friendly NGSO satellite system—including the fact that *operating below 600 km (as SpaceX proposes) significantly decreases the impact of reflected sunlight.*
- Accordingly, Viasat has failed to raise any reason—let alone the “extraordinary circumstances” required—to justify overturning decades of precedent in this case.
- In contrast to the extensive measures that SpaceX has implemented to minimize its environmental footprint, Viasat has filed its own modification that would make its proposed NGSO system *worse* for the environment on all of the metrics raised in its Petition. Thus, the only thing “extraordinary” about Viasat’s Petition is its evident lack of self-awareness.
- SpaceX urges all would-be NGSO operators, including Viasat and Amazon, to follow SpaceX’s lead in ensuring safe operations that minimize their environmental footprint, ensure the safety of life on the ground, and protect the night sky for exploration by future generations.
- Each effort Viasat has taken against SpaceX demonstrates its growing desperation about increased competition. Quickly dismissing these types of transparently anti-competitive filings would send a strong signal to Viasat to stop wasting Commission resources and trivializing important issues through anti-competitive gamesmanship.

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Viasat's Petition—filed at the eleventh hour just as the application is ripe for grant—asks the Commission to require its competitor, SpaceX, to be singled out to undergo a lengthy and unnecessary environmental review process. This is a transparent and anti-competitive ploy, and nothing else. Rather than stand for the proposition it claims to support, Viasat's Petition in fact serves to highlight the many massive benefits of SpaceX's modification, such as improving the debris profile of its system, reducing the time non-propulsive satellites remain in orbit, reducing the collision risk of its system, and reducing the effect on astronomers and the night sky. And despite its trademark over-the-top rhetoric, Viasat presents no reason for the Commission to second guess its long-standing conclusion that satellite authorizations categorically do not have significant environmental effects warranting individualized environmental review. Yet, while SpaceX's modification demonstrates its own commitment to the space environment, Viasat's Petition does demonstrate how other NGSOs—particularly Viasat itself—fall short of the high standard set by SpaceX. SpaceX looks forward to other operators such as Viasat and Amazon following SpaceX's lead in its commitment to environmental protection.

Unfortunately, Viasat's newfound environmentalism only extends to SpaceX. Viasat addressed none of these environmental issues in its own pending application to launch hundreds of additional satellites and operate them at an altitude that is far more likely to disrupt astronomical observations. It also raised no environmental concerns with recent applications by Amazon and other operators to launch thousands of new satellites. Instead, Viasat's concerns are focused on a single competitor, SpaceX, and its application to merely improve the debris profile of the satellites the Commission has already authorized by lowering them to orbits that are inherently safer and would have less impact on the environment.

SpaceX's application is an odd target for a petition citing the National Environmental Protection Act ("NEPA") in good faith, even assuming the statute applies to activities in space (which it does not). Because the Commission has categorically determined that satellite licensing does not present significant environmental concerns, further NEPA review is justified only if "extraordinary circumstances" indicate that the action will have a "significant effect." Yet the application Viasat challenges would not result in the launch of a single additional satellite (in fact, it would reduce the number of satellites by one) and would, if anything, reduce each of the potential environmental effects that Viasat describes:

Light Pollution — Though high on rhetoric, Viasat's Petition provides no evidence that SpaceX's modification will have any adverse effect on light pollution, whether to professional astronomers or those simply seeking to enjoy the night sky. In fact, Viasat carefully avoids disclosing that the very studies it relies upon clearly demonstrate that the proposed modification would *reduce* light pollution, and explicitly credit SpaceX for working closely with the astronomy community to address its concerns. For example, Viasat relies upon a study whose primary finding is that satellites operating at altitudes below 600 km present less concern because, unlike satellites at higher altitudes, they are in Earth's shadow and invisible for many hours per night around local solar midnight. In fact, that report includes the recommendation that, to mitigate effects on astronomy, operators should "[d]eploy satellites at orbital altitudes no higher than ~600 km"—precisely the modification SpaceX proposes and Viasat seeks to prevent. SpaceX welcomes Viasat's recent commitment to astronomy and encourages it to reconsider its own application to deploy 14 times more satellites than currently authorized to an altitude that astronomers have found to be more harmful to their observations.

Orbital Debris — While the Commission has correctly concluded that SpaceX’s previous modification to lower its initial deployment of satellites would “allow SpaceX to make efficient use of valuable spectrum resources more safely,” Viasat continues efforts to resuscitate its tired claims that SpaceX’s proposal to lower its remaining satellites will somehow increase the risk of orbital debris. This latest repackaging of arguments Viasat has made throughout this proceeding raises no substantive issues not already fully briefed for Commission consideration in addressing the merits of SpaceX’s application. If anything, this latest maneuver is a tacit acknowledgment that Viasat’s previous claims lacked merit.

In addition to reprising its false and debunked claims, Viasat adds two new misrepresentations. First, Viasat falsely asserts that SpaceX “admits” that lowering its satellites’ altitude will result in an increased risk of collision. This assertion is simply false. In fact, SpaceX has demonstrated that the lower altitude will actually *decrease* the risk of collision (primarily by dramatically shortening the worst-case time on orbit). Indeed, the reduced risk of collision and orbital debris is the primary reason that SpaceX seeks to operate its satellites at a lower altitude. Second, Viasat makes the bizarre claim that SpaceX has no incentive to avoid collisions because it can simply launch additional satellites to replace those that have been destroyed. Viasat goes on to contradict its own claim by arguing that collisions on-orbit could generate sufficient debris to endanger other space operations, or even render orbits “unusable.” Contrary to Viasat’s many conflicting claims, SpaceX depends on a sustainable orbital environment for all of its operations, including launching astronauts to the International Space Station. Nobody has a greater incentive than SpaceX to ensure that low-Earth orbit remains free of debris.

Pollution Caused by Launch and Reentry — Viasat claims that SpaceX’s modification would harm the environment by increasing the number of launches and satellite reentries, both of

which, Viasat asserts, might have environmental effects. But SpaceX's modification has no bearing whatsoever on the environmental concerns Viasat conjures up because the modification would not increase the number of deployed satellites launched or reentering the atmosphere. Viasat's claim to the contrary rests solely on the fact that the time for a satellite to *passively deorbit* would be shorter at the lower proposed altitudes. But this relates only to the worst-case time-to-demise of a satellite after the end of its mission, not the mission duration itself or the deorbit cadence planned for every SpaceX satellite. Thus, even if one were to assume that the launch and demise of satellites could have a significant environmental effect, SpaceX's application would not implicate these concerns.

Viasat also alleges that SpaceX's application will endanger aircraft and people on the ground by somehow increasing the amount of debris that survives atmospheric reentry. This also has nothing to do with the proposed modification which, as explained above, will not increase the number of reentering satellites. But even if it did, Viasat's argument would still be entirely off base given that SpaceX's satellites will fully demise upon reentry. Rather than grapple with this inconvenient fact, Viasat attempts to wish it away by mischaracterizing SpaceX's demisability analysis as a mere "assertion" at which the Commission has not taken a "hard look." However, SpaceX validated its conclusion with a Commission-mandated analysis using software purpose-built by NASA. Moreover, while SpaceX has repeatedly advocated for rules that require all systems to design for total atmospheric demise, Viasat has not supported such a requirement.

Notably, although SpaceX's pending application would improve—or at worst, maintain—the environmental metrics Viasat describes, the same cannot be said for Viasat's own pending application to modify its system. While SpaceX's modification will result in no change in the number of satellite launches or reentries, Viasat's modification would clearly increase both by

proposing to operate hundreds of additional satellites. Likewise, while SpaceX seeks to lower its altitude to reduce the risk of orbital debris, Viasat's proposal would add hundreds of new satellites at an altitude where, if a satellite were to fail, it would continue to orbit uncontrolled for hundreds of years, posing a grave orbital debris risk. These new satellites would also operate at 1,300 km meaning that, unlike satellites below 600 km, they would remain illuminated by the sun all night for most of the year, becoming a significant new source of light pollution according to the studies Viasat has submitted in support of its Petition. Viasat has never presented any evidence it intends to take any of the measures that SpaceX is taking, and that astronomers have recommended, to mitigate the impact of Viasat's hundreds of new satellites on astronomy or casual enjoyment of the night sky. Worse, Viasat has taken the extreme position of expressly reserving the right to make its system more risky if allowed under the Commission's rules. SpaceX is filing this opposition, and the Petition to which it responds, for the record in Viasat's application.

Accordingly, because SpaceX's modification actually demonstrates SpaceX's commitment to the orbital environment, Viasat has presented no "extraordinary circumstances" that warrant the Commission overturning its long-standing conclusion that satellite authorizations categorically do not have significant environmental effects requiring individualized environmental review.

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For Modification of Authorization for the)	
SpaceX NGSO Satellite System)	File No. SAT-MOD-20200417-00037
VIASAT, INC.)	
For Modification of the Viasat)	Call Sign: S2985
Non-Geostationary Orbit Satellite System)	
Using Ka- and V-Band Frequencies)	File No. SAT-MPL-20200526-00056
_____)	

**OPPOSITION OF SPACE EXPLORATION HOLDINGS, LLC TO
PETITION PURSUANT TO SECTION 1.1307(c) OF VIASAT, INC.**

Space Exploration Holdings, LLC (“SpaceX”) hereby opposes the unprecedented and belated request by Viasat, Inc. (“Viasat”) that the Commission override its rules and ignore its prior precedent by denying or deferring SpaceX’s above referenced modification application based on environmental concerns.¹ In a tacit acknowledgment of the absence of merit of its previous attacks on SpaceX, Viasat’s Petition now attempts to find a new legal theory for its recycled issues and inject it into the voluminous record of this proceeding many months after they should have been raised (if at all), seeking to invoke an onerous and time-consuming process just as the application is ripe for grant. Yet as demonstrated below, SpaceX’s modification actually would improve its environmental footprint and its impact on the orbital environment. None of the issues raised now by Viasat require the Commission to undertake a further environmental evaluation of

¹ See Petition Pursuant to Section 1.1307(c) of Viasat, Inc., IBFS File No. SAT-MOD-20200417-00037 (Dec. 22, 2020) (“Viasat Petition”).

the proposed modification of SpaceX’s non-geostationary orbit (“NGSO”) Fixed-Satellite Service (“FSS”) system, or to delay grant of the application that will enable SpaceX to continue to deploy its high-capacity, low-latency broadband network.

Viasat’s choice to use this modification application as the vehicle to propose a uniquely onerous scope of review is particularly ironic, given that the modification actually improves upon—or at worst, maintains—each of Viasat’s purported concerns. For example, as the Commission has recognized, operating at the much lower altitudes proposed here has significant public interest benefits in that orbital debris (including failed satellites) tends to deorbit in relatively short order, significantly decreasing the risk posed to ongoing operations in space.² In fact, in granting SpaceX’s previous modification to lower satellites to similar orbits, the Commission specifically found that the modification would make operations safer.³ Operating at lower altitude will also yield benefits in mitigating the potential impact on astronomical observations—an area in which SpaceX is the undisputed industry leader. In addition, nothing about operating at lower altitude will change the number of satellites or the pace of deployment and deorbiting, maintaining the status quo with respect to environmental impact.

Ironically, the concerns Viasat raises would apply more directly to its own pending modification application, which proposes to increase the number of satellites by a factor of more than fourteen and to operate them at an altitude where they will create more light pollution, or to the recent application of Kuiper Systems, LLC (“Amazon”) that proposed a completely new

² See, e.g., *Mitigation of Orbital Debris in the New Space Age*, 35 FCC Rcd. 4156, ¶ 43 (2020) (“*Orbital Debris Mitigation Update Order*”) (“missions deploying above 650 km altitude may represent a greater risk from a long-term orbital debris perspective, since satellites that fail above that altitude will generally not re-enter Earth’s atmosphere within 25 years, and depending on the deployment altitude, may be in orbit for centuries or longer”).

³ See *Space Exploration Holdings, LLC*, 34 FCC Rcd. 2526, ¶ 1 (IB 2019) (“*Modification Order*”) (finding that grant of the application “will allow SpaceX to make efficient use of valuable spectrum resources more safely, quickly, and cost-effectively”), *on reconsideration*, 35 FCC Rcd. 5649 (IB 2020).

system with more satellites (3,236) and at a slightly higher altitude (590-630 km) than SpaceX's modification.⁴ Yet Viasat failed to address these issues in its own application or to raise them in connection with Amazon's or any other NGSO application. SpaceX therefore urges Viasat and Amazon—assuming Amazon files its required modification⁵—to follow SpaceX's lead in designing its system to address these issues.

This mismatch between the concerns Viasat raises and the public interest benefits of the modification that it opposes simply confirms the obvious: the Petition is a blatantly anti-competitive eleventh-hour attack by a party that will stop at nothing to delay the only operational NGSO FSS system offering consumer service from continuing to deploy its high-capacity, low-latency broadband system and thereby increasing its advantage over less capable operators such as Viasat. The Commission should reject such regulatory gamesmanship and approve SpaceX's modification application without delay.

BACKGROUND

I. SPACEX IS ALREADY LICENSED TO LAUNCH AND OPERATE OVER 4,400 SATELLITES; THE PROPOSED MODIFICATION WOULD JUST LOWER THE ORBITAL ALTITUDE FOR 2,824 OF THEM, IMPROVING THE IMPACT ON THE SPACE ENVIRONMENT

In March 2018, the Commission authorized SpaceX to deploy an NGSO constellation composed of 4,425 satellites operating in Ku- and Ka-band spectrum at altitudes from 1,110 km to 1,325 km.⁶ The Commission subsequently granted SpaceX's request to modify that authorization to relocate 1,584 satellites previously authorized to operate at an altitude of 1,150 km

⁴ See Description of Modification and Analysis Under Commission Framework, IBFS File No. SAT-MPL-20200526-00056 (May 26, 2020) ("Viasat Application"); Application for Authority to Launch and Operate a Non-Geostationary Satellite Orbit System in Ka-Band Frequencies, IBFS File No. SAT-LOA-20190704-00057 (July 4, 2019).

⁵ See *Kuiper Systems, LLC*, 35 FCC Rcd. 8324, ¶ 64 (2020) ("Prior to initiation of service, Kuiper must seek and obtain the Commission's approval of a modification containing an updated description of the orbital debris mitigation plans for its system").

⁶ See *Space Exploration Holdings, LLC*, 33 FCC Rcd. 3391 (2018).

to an altitude of 550 km.⁷ The Commission found that this modification would serve the public interest by improving broadband latency while decreasing the potential for orbital debris and would result in no material change in interference.⁸ SpaceX has proceeded rapidly with deployment of its NGSO system, launching over 880 satellites to date to the 550 km altitude.

In the application now under consideration, SpaceX proposes to further improve the potential orbital debris profile of its system with a slight decrease in its total number of satellites and relocation of 2,824 satellites to 540-570 km altitudes to achieve the same public interest benefits as the modification previously approved. In its application, SpaceX demonstrated (among other things) that operating at a lower altitude offers several attractive features both during nominal operation and in unplanned scenarios, yields tangible benefits such as rapid, passive disposal in the unlikely event of a failed spacecraft, and provides a more favorable debris environment in general due to the effects of increased atmospheric drag.⁹ SpaceX demonstrated that it would satisfy the NASA safety standard for collision risk by several orders of magnitude and discussed the steps it has taken to avoid conjunctions with other NGSO systems.¹⁰ SpaceX also noted that it was the first NGSO licensee in its processing round to reach an agreement with radio astronomers to ensure its service does not interfere with radio observatories, and discussed its ongoing efforts to address concerns of optical astronomers as well.¹¹

In response to the application, Viasat filed a petition to deny that focused primarily on orbital debris mitigation issues, and in particular the collision risk Viasat believed the modification

⁷ See *Modification Order*, *supra* note 3.

⁸ See *id.* ¶ 11.

⁹ See Application for Modification of Authorization for the SpaceX NGSO Satellite System, IBFS File No. SAT-MOD-20200417-00037, Narrative at 6-7, 10-11, Attachment A at 18-20 (Apr. 17, 2020) (“Modification Application”).

¹⁰ See *id.* Attachment A at 20-24.

¹¹ See *id.* Narrative at 12-14.

would create, including by using a collision metric never adopted by the Commission.¹² Throughout this proceeding, Viasat has continued to repackage the same issues, even after they had been questioned by the very scientists on whom Viasat relies to make its claims.¹³ But on December 22, 2020—more than eight months after SpaceX filed its modification application—Viasat for the first time raised a concern about the potential impact of the modification on the environment. Specifically, Viasat claims that the modification will have a significant effect on the environment such that the Commission must consider three broad categories of environmental impact under the National Environmental Protection Act (“NEPA”):

1. sunlight reflecting off satellites;
2. collision risk; and
3. a variety of allegations concerning the effects of launching and deorbiting satellites.¹⁴

Viasat then makes the unprecedented claim that the Commission must therefore prepare an environment impact statement (“EIS”) before acting on SpaceX’s modification, or alternatively require preparation of an environmental assessment (“EA”).¹⁵ Notably, Viasat has never called for an EIS or EA for any other satellite system, including Amazon’s constellation that would appear to present more cause for concern on many of the metrics raised now by Viasat.

¹² See Petition to Deny or Defer of Viasat, Inc., IBFS File No. SAT-MOD-20200417-00037 (July 13, 2020) (“Viasat PTD”).

¹³ See Letter from Jonathan McDowell to Marlene H. Dortch, IBFS File No. SAT-MOD-20200417-00037 (Sep. 21, 2020) (describing Viasat’s arguments as “a misreading of my results” that “does not seem remotely justifiable to me”).

¹⁴ See Viasat Petition at ii-iii.

¹⁵ *Id.* at iii. As a procedural matter, the Commission has made clear that its NEPA rules “do not delineate any circumstances in which an EIS is automatically triggered. Only proposals which, after evaluation of an Environmental Assessment (and an opportunity to amend) demonstrably have a significant environmental impact, will be subject to EISs.” *Amendment of Environmental Rules in Response to New Regulations Issued by the Council on Environmental Quality*, 60 Rad. Reg. 2d (P&F) 13, ¶ 14 (1986) (“NEPA Rules Order”).

II. BECAUSE THE COMMISSION HAS PREVIOUSLY DETERMINED THAT SPACE STATION AUTHORIZATIONS DO NOT HAVE A SIGNIFICANT EFFECT ON THE ENVIRONMENT, VIASAT MUST SHOW THAT “EXTRAORDINARY CIRCUMSTANCES” REQUIRE A DIFFERENT CONCLUSION HERE

NEPA requires federal agencies to identify and evaluate the environmental effects of proposed “major Federal actions” and to prepare a “detailed statement” for such actions if they will “significantly affect[] the quality of the human environment.”¹⁶ However, in enacting NEPA, Congress “did not require agencies to elevate environmental concerns over other appropriate considerations.”¹⁷ Rather, the statute imposes certain procedural requirements, but “does not mandate particular consequences.”¹⁸

Under Section 204 of NEPA, the Council on Environmental Quality (“CEQ”) is entrusted with NEPA oversight responsibility.¹⁹ The CEQ’s regulations direct agencies to identify their Federal actions and place each within one of three categories: (1) actions that are likely to have significant environmental effects and are therefore appropriate for an EIS; (2) actions that are not likely to have significant effects or the significance of the effects is unknown and are therefore appropriate for an EA; and (3) actions that normally do not have significant effects and are therefore categorically excluded from further environmental processing.²⁰ Actions that require an EA or EIS face significant delays and paperwork burdens. The CEQ recently found that the average time for completion of an EIS was 4.5 years and that draft EISs averaged 575 pages.²¹

¹⁶ See 42 U.S.C. § 4332(2)(C).

¹⁷ *Baltimore Gas & Elec. Co. v. Nat. Res. Def. Council, Inc.*, 462 U.S. 87, 97 (1983).

¹⁸ *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 194 (D.C. Cir. 1991).

¹⁹ See 42 U.S.C. § 4344.

²⁰ See 40 C.F.R. § 1501.3(a).

²¹ See Council on Environmental Quality, *Environmental Impact Statement Timelines (2010–2018)*, EIS TIMELINES (June 12, 2020), <https://ceq.doe.gov/nepa-practice/eis-timelines.html>; Council on Environmental Quality, *Length of Environmental Impact Statements (2013–2018)*, EIS LENGTH (June 12, 2020), <https://ceq.doe.gov/nepa-practice/eis-length.html>.

The Commission has determined that none of its actions are likely to have significant environmental effects.²² Section 1.1307 of the Commission’s rules establishes the types of actions that require preparation of an EA because they may have a significant environmental impact.²³ Subsection (a) lists certain types of areas (such as officially designated wilderness areas, wildlife preserves, and Indian religious sites) that, if affected, would trigger an EA requirement. Subsection (b) requires preparation of an EA if a particular facility would cause human exposure to levels of radiofrequency radiation in excess of the limits in Sections 1.1310 of the Commission’s rules. Viasat does not allege that any of these provisions apply here.

Section 1.1306 provides that “Commission actions not covered by § 1.1307(a) and (b) are deemed individually and cumulatively to have no significant effect on the quality of the human environment and are categorically excluded from environmental processing.”²⁴ The Commission made this finding and adopted these categorical exclusions through a notice and comment rulemaking proceeding. The CEQ approved the exclusions as consistent with its regulations and NEPA.²⁵ This regime was “designed primarily to reduce paperwork and delays by eliminating unnecessary environmental processing and to improve the quality of agency decisions that affect the environment.”²⁶ Viasat concedes that the effects cited in its Petition fall into this class of categorically excluded actions.

Consistent with CEQ requirements, the Commission also adopted a provision under which an interested person may file a petition setting forth in detail the circumstances necessitating environmental processing for a particular action that the person believes will have a significant

²² See *NEPA Rules Order* ¶ 4.

²³ See 47 C.F.R. § 1.1307.

²⁴ *Id.* § 1.1306(a).

²⁵ See *NEPA Rules Order* ¶ 3; 40 C.F.R. § 1507.3(a).

²⁶ *NEPA Rules Order* ¶ 2.

environmental effect but which would otherwise be categorically excluded.²⁷ To prevail, such a petition must demonstrate “extraordinary circumstances” in which a normally excluded action may have a significant environmental effects.²⁸ However, “[i]f an extraordinary circumstance is present, the agency nevertheless may categorically exclude the proposed action if the agency determines that there are circumstances that lessen the impacts or other conditions sufficient to avoid significant effects.”²⁹

In the thirty-five years since the Commission adopted the current format of its NEPA rules it has never found a case in which “extraordinary circumstances” justify environmental processing of a categorically excluded action. In addition, the CEQ regulations make clear that “major Federal action” does not include “[e]xtraterritorial activities or decisions, which means agency activities or decisions with effects located entirely outside of the jurisdiction of the United States.”³⁰ Like over 100 other countries, the United States is a signatory to the *Outer Space Treaty*, which provides that space “is not subject to national appropriation by claim of sovereignty.”³¹ Accordingly, there is significant doubt that NEPA applies to activities in space at all. However, the Commission need not reach that issue here because, as demonstrated below, there is no basis for conducting an environmental review of the proposed modification even assuming the statute applies. A finding to the contrary could open the floodgates to environmental reviews for a wide array of space-based

²⁷ 47 C.F.R. § 1.1307(c).

²⁸ 40 C.F.R. § 1501.4(b).

²⁹ *Id.* § 1501.4(b)(1).

³⁰ *Id.* § 1508.1(q)(1)(i).

³¹ Treaty on Principles Governing Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies art. II, Jan. 27, 1967 (“*Outer Space Treaty*”), <https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/outerspacetreaty.html>. Although the treaty does not establish the altitude at which space begins, the most commonly cited demarcation is 100 km – often referred to the Karman Line – though more recently an altitude of 80 km has been considered. *See, e.g.*, Federation Aeronautique Internationale, *Statement About the Karman Line*, NEWS (Nov. 30, 2018), <https://www.fai.org/news/statement-about-karman-line>. In any event, the 540-570 km altitudes proposed by SpaceX are well above any such line.

proposals going forward, imposing a significant and unnecessary burden on applicants and Commission resources.

The Commission's rules direct that in contesting an application for modification of a station license, "objections based on environmental considerations shall be filed as petitions to deny."³² Viasat instead waited over five months after such petitions were due before raising these NEPA issues. Viasat seeks to excuse its tardiness by citing three documents "that had not yet been released at the time of Viasat's initial petition."³³ Yet there can be no doubt that Viasat actually knew many months ago about each of the issues it has raised in this Petition. Indeed, SpaceX addressed the issue of satellite reflectivity in its application,³⁴ and Viasat discussed its concerns about the risk of orbital debris in general and collision in particular in its original petition to deny.³⁵ The only thing that has truly changed in those intervening months is that Viasat apparently became concerned enough about the ineffectiveness of its arguments against the modification that it decided to make a yuletide submission in a desperate attempt to repackage old issues to delay grant of the application.

DISCUSSION

I. NONE OF THE ISSUES RAISED BY VIASAT CONSTITUTE "EXTRAORDINARY CIRCUMSTANCES" REQUIRING COMMISSION RECONSIDERATION UNDER NEPA

As discussed above, the Commission has determined that space station licensing decisions are presumptively excluded from environmental processing, as they fall into the category of actions that can be expected to have no significant effect on the quality of the human environment. The Viasat Petition cites three broad categories of effects that it claims provide the "extraordinary

³² See 47 C.F.R. § 1.1313(a).

³³ Viasat Petition at 1 n.1.

³⁴ See Modification Application, Narrative at 12-14.

³⁵ See Viasat PTD at 6-36.

circumstances” necessary to require the Commission to reconsider that determination: (1) effects from the sun reflecting off SpaceX satellites; (2) effects from the generation of orbital debris by SpaceX satellites; and (3) effects from launching and deorbiting SpaceX satellites. Below we demonstrate that there will be no such effects, much less “extraordinary circumstances” that would justify the time- and resource-intensive environmental processing Viasat demands. In fact, the modification would alleviate many of the supposed concerns that Viasat now raises.

A. In Considering Potential Environmental Effects of the Proposed Modification, SpaceX’s Existing Authorization Establishes the Baseline

NEPA requires the Commission to consider the environmental effects of “major Federal actions.” In this case, the only “action” at issue is the potential grant of SpaceX’s proposed modification. Several important conclusions follow from this fact. First, in assessing the environmental effects, SpaceX’s existing authorization establishes the baseline for comparison. After all, that is both the current status quo and the authorization under which SpaceX would continue to proceed if the Commission were to deny the modification.³⁶ Second, the Commission need not consider SpaceX’s existing V-band authorization—those satellites are already authorized, and the proposed modification would not affect them. Third, for similar reasons, the Commission need not consider SpaceX’s unrelated application for a new NGSO constellation. That application has yet to be accepted for filing, and no action in this proceeding will change its status in any way.

Accordingly, the Commission can ignore Viasat’s attempts to confuse the issue by invoking imagined perils arising from the combination of SpaceX’s existing authorization, V-band authorization, and pending application.³⁷ The only action that SpaceX seeks here—and therefore

³⁶ The CEQ regulations make clear that effects relevant for consideration “do not include those effects that . . . would occur regardless of the proposed action.” 40 CFR § 1508.1(g)(2).

³⁷ *See, e.g.*, Viasat Petition at 12. To the extent Viasat is attempting to describe a cumulative effect of these authorizations and applications, such effects were recently removed from NEPA consideration under the CEQ’s

the only action at issue for purposes of NEPA—is the relocation of 2,824 already-authorized satellites from operating altitudes of 1,110-1,325 km to 540-570 km.

B. The Proposed Modification Will Actually Reduce the Impact of Light Reflected from SpaceX Satellites

SpaceX is committed to promoting all forms of space exploration, which is why it was the first NGSO licensee in its processing round to reach an agreement with radio astronomers to ensure its service does not interfere with radio observatories.³⁸ SpaceX has also taken a litany of proactive steps to ensure its operations do not materially impact optical astronomy. For example, it has tested an experimental darkening treatment designed to reduce the visibility (albedo) on one in-orbit satellite and has for months been deploying satellites with visors to shield reflective surfaces from the sun’s glare. It is also devising operational procedures to ensure that satellites are oriented in a way that reduces potential reflections toward the Earth during all phases of operations. Such efforts have enabled SpaceX to make its satellites all but invisible to the naked eye.³⁹ In addition, SpaceX is making highly accurate satellite tracking data available so astronomers can better coordinate their observations with its satellites. As a result of these efforts, it is no surprise that astronomers have concluded that SpaceX “has been very cooperative in working with researchers, devoting significant resources towards finding solutions to this crisis for astronomy. We hope all

rules. See 40 C.F.R. § 1508.1(g)(3) (“Cumulative impact, defined in 40 CFR 1508.7 (1978), is repealed.”). Moreover, the statutory period for seeking reconsideration of SpaceX’s existing authorizations has long since passed. See 47 U.S.C. § 405(a).

³⁸ See Press Statement 19-005, *Statement on NSF and SpaceX Radio Spectrum Coordination Agreement*, NATIONAL SCIENCE FOUNDATION (June 4, 2019), https://www.nsf.gov/news/news_summ.jsp?cntn_id=298678.

³⁹ See J. Tregloan-Reed et al., *First Observations and Magnitude Measurement of Starlink’s Darksat*, *Astronomy and Astrophysics* (Apr. 23, 2020), <https://arxiv.org/pdf/2003.07251.pdf>.

satellite operators follow their example, for the benefit of everyone involved in research, amateur astronomy and other practices requiring dark skies.”⁴⁰

Nonetheless, Viasat makes the unsupportable assertion that the proposed modification would somehow increase “light pollution” in the form of sunlight reflecting off SpaceX satellites towards the Earth’s surface.⁴¹ But the Commission need look no further than the studies cited in the Viasat Petition itself to conclude that relocating satellites from altitudes of 1,110-1,325 km to 540-570 km would have precisely the opposite effect. Indeed, it is NGSO systems operating at altitudes near 1,200 km—such as the one proposed by Viasat—that present a much greater threat to astronomical observation.

For example, Viasat cites an August 2020 report by the SATCON1 Scientific Organizing Committee—one of the three “new” reports Viasat claims should justify its belated filing⁴²—as supporting the contention that operating at altitudes below 614 km would have “significant negative impacts” on astronomy.⁴³ Viasat’s selective citation of this source is highly disingenuous. It ignores the critical conclusion highlighted in the report’s executive summary:

The key difference between lower (~600 km) and higher (~1200 km) orbits is the visibility in the dark of night between astronomical twilights: ***higher altitude constellations can be visible all night long during summer, with only a small reduction in the number visible compared to those in the twilight.***⁴⁴

⁴⁰ A. Venkatesan et al., *The impact of satellite constellations on space as an ancestral global commons*, NATURE ASTRONOMY (Nov. 2020), <https://www.nature.com/articles/s41550-020-01238-3>. See also Shannon Hall, *SpaceX Plans Sunshades to Save Night Skies from Starlink Satellites*, N.Y. TIMES (May 6, 2020) (quoting Dr. Anthony Tyson, chief scientist of the Rubin Observatory: “[t]he fact that SpaceX has taken an attitude that they want to solve the problem sets a moral high ground for other operators to follow”), <https://www.nytimes.com/2020/05/06/science/spacex-starlink-astronomy.html>.

⁴¹ See Viasat Petition at 16.

⁴² See *id.* at 3.

⁴³ *Id.* at 19-20.

⁴⁴ Walker, C. et al., *Impact of Satellite Constellations on Optical Astronomy and Recommendations Toward Mitigations* 3-4 (2020) (“Optical Astronomy Report”) (emphasis added) (Exhibit 19 to Viasat Petition).

Indeed, Finding 1 of the report concludes that “[f]ull-night illumination causes these high-altitude constellations to impact a larger set of astronomical programs.”⁴⁵ Not surprisingly, one of the primary recommendations for mitigating the impact of LEO satellites on astronomical observations is simple: “***Deploy satellites at orbital altitudes no higher than ~600 km.***”⁴⁶ SpaceX developed and has already implemented the other mitigation strategies suggested in the report.⁴⁷ Those actions were within its control. SpaceX now seeks authority from the Commission to implement the primary recommendation of the report. Yet Viasat seeks to prevent this operational change in the name of reducing light pollution – *when its obstruction will patently result in exactly the opposite result.*

In yet another irony, Viasat’s own currently pending modification application targets an operational altitude that is likely to have much worse light pollution effects. Viasat proposes to increase its constellation by 14 times, and to relocate it to 1,300 km altitude. Yet as the study it relies upon here concludes, NGSO constellations at such altitudes “present particularly serious challenges; they will be visible all night during summer and significant fractions of the night during winter, fall, and spring, and will have negative impacts on nearly all observational programs.”⁴⁸ For that reason, it recommends “[s]atellites on orbits as low as possible. No satellites at >>600 km. Satellites at 1200 km are particularly damaging.”⁴⁹ Viasat has not acknowledged this issue, much less addressed it, in its own modification proceeding.

⁴⁵ *Id.* at 5.

⁴⁶ *Id.* at 5-6 (emphasis added).

⁴⁷ The study also recommends that NGSO operators “[d]arken satellites by lowering their albedo, shading reflected sunlight, or some combination thereof” and “[c]ontrol each satellite’s attitude in orbit so that it reflects less sunlight to Earth.” *Id.* at 6. It confirms that “SpaceX has shown that operators can reduce reflected sunlight through satellite body orientation, Sun shielding, and surface darkening.” *Id.* at 4.

⁴⁸ Optical Astronomy Report at 8.

⁴⁹ Walker, C. et al., *Appendices to “Impact of Satellite Constellations on Optical Astronomy and Recommendations Toward Mitigations”* 49 (2020) (Exhibit 20 to Viasat Petition).

The other study Viasat primarily relies upon reached a similar conclusion. To assess the potential impact of a large NGSO system on an astronomical observatory, it modeled hypothetical constellations at 500 km and 1,200 km to illustrate the tradeoff between altitude and illumination. The results definitively showed that at the 500 km altitude, fewer satellites were illuminated and they affected a much smaller portion of the night sky than did satellites at 1,200 km.⁵⁰ In summary, the study concluded that “[s]atellites at lower altitudes are brighter but have less impact because they move into Earth’s shadow earlier than satellites at higher altitudes.”⁵¹ Here again, the very study upon which Viasat relies demonstrates that granting the proposed modification would *reduce* the potential impact of SpaceX’s NGSO system on astronomers and others who look to the night sky. If Viasat really cared about reducing the potential impact of NGSO systems on astronomy, it would support SpaceX’s modification—and revise its own proposed operations.

Viasat also asserts that light pollution in space can have aesthetic effects, social and cultural effects, and health effects due to its impact on stargazers.⁵² Yet all of those effects presuppose that the light pollution at issue is “visible to the naked eye.”⁵³ Otherwise, the effects would not be discernable to the vast majority of people in their daily lives. As discussed above, SpaceX has already adopted extensive technological and operational practices that significantly reduce the amount of sunlight reflected by its satellites and all but render them invisible to the naked eye, and is continuing to work with astronomers to achieve still more mitigation. But for purposes of the Commission’s assessment of Viasat’s arguments, the more important fact is that granting the

⁵⁰ Luc H. Riesbeck et al., *The Future of the Night Sky: Light Pollution from Satellites 5-8* (2020) (Exhibit 18 to Viasat Petition).

⁵¹ *Id.* at 3.

⁵² *See* Viasat Petition at 16-19.

⁵³ *Id.* at 18.

modification so that SpaceX can operate all its satellites at lower altitude will only improve the situation.

C. The Proposed Modification Will Enhance the Orbital Debris Mitigation Profile of SpaceX’s NGSO Constellation

As SpaceX stated in its application, the prime motivating factor for both its previous modification that the Commission approved and the current proposal to relocate the remainder of its satellites to lower altitude was the attendant enhancements to space safety. Over the course of this proceeding, SpaceX has presented voluminous evidence that the modification would reduce the orbital debris risk profile of its NGSO system. For example, reproduced below as Table 1 is a previously submitted⁵⁴ summary of the risk of collision for a SpaceX satellite that has lost maneuver capability, as determined using the most recent version of NASA’s Debris Assessment Software (“DAS” v.3.1.0) applied to the proposed modification.

Altitude (km)	Current Satellite Design		Satellite with Sun Shade Panels	
	Maintained	Tumbling	Maintained	Tumbling
540	0.000069	0.000053	0.000071	0.000053
560	0.000139	0.000106	0.000142	0.000108
570	0.000138	0.000101	0.000141	0.000103

Table 1. Post-Modification Collision Risk Assuming No Maneuver Capability

This collision risk profile is many times lower than the 0.001 standard recently adopted by the Commission.⁵⁵ As importantly, it represents a reduction of the collision risk compared to satellites

⁵⁴ See Letter from William M. Wiltshire to Jose P. Albuquerque, IBFS File No. SAT-MOD-20200417-00037, at 2 (July 7, 2020).

⁵⁵ See *Orbital Debris Mitigation Update Order* ¶¶ 33-34.

operating at the currently authorized higher altitudes by a factor of several hundred.⁵⁶ SpaceX has also demonstrated that its satellites will achieve 100% deorbit reliability at the lower altitudes proposed in the modification, exchanging the hundreds of years required for natural orbital decay of a satellite at 1,110-1,325 km for a period of less than five years for a satellite at the 540-570 km altitudes, even considering worst-case assumptions.⁵⁷

Despite all this evidence, Viasat asserts—without supporting citation—that “SpaceX admits, as it must, that its modification involves greater collision risks than before.”⁵⁸ This statement is patently false, and simply indefensible given the record SpaceX has established on orbital debris issues in this proceeding.

Indeed, both SpaceX and Viasat have submitted a great deal of material on orbital debris issues in this proceeding (although Viasat has submitted significantly less material about the risks presented by its own system). The Commission has adopted stringent requirements for U.S.-licensed systems designed to mitigate such debris, including recent updates that enhanced the regime still further based on the best available technical inputs from interested parties and other expert agencies, including NASA. These issues have been fully litigated in the record, and the Commission has all the information it needs to determine whether the proposed modification would comply with its rules. Perhaps recognizing that its arguments are failing, Viasat is now attempting to give them new life by repackaging the same stale claims within a thin veneer of environmental concern. Viasat even goes so far as to cite its prior submissions in this proceeding—

⁵⁶ See Letter from William M. Wiltshire to Jose P. Albuquerque, IBFS File No. SAT-MOD-20200417-00037, at 2 (May 15, 2020) (a non-propulsive satellite operating at the currently authorized altitude of 1,110 km would have a 0.0392 collision risk with attitude maintained).

⁵⁷ See Modification Application, Technical Attachment at 19-20.

⁵⁸ Viasat Petition at 24.

again undercutting its claim that it could not have raised these NEPA arguments in a timely manner.⁵⁹

But the Commission should not play Viasat's game. It already has a comprehensive and up-to-date regime for considering the implications of orbital debris, and Viasat presents no reason other than anti-competitive obstruction for a redundant analysis under NEPA. In this regard, the situation is similar to radiofrequency radiation in which the Commission determined that compliance with the human exposure limits in its rules would preclude the need for further environmental processing.⁶⁰ Here again, the Commission has already adopted a full suite of rules and policies on orbital debris mitigation, making further consideration under the umbrella of NEPA unnecessary and redundant.

Like Viasat, SpaceX recognizes that collisions between satellites and orbital debris could compromise the orbits involved.⁶¹ As the only NGSO FSS operator currently offering commercial service to consumers—and as the nation's premier launch provider—SpaceX has more incentive than anyone to ensure that its satellites avoid such collisions and the debris they create. Yet after recognizing the debilitating effects collisions can have on operations in space, Viasat makes the bizarre argument that SpaceX will not be concerned “because SpaceX knows that when its satellites do collide with other space objects and fragment or fail, it can always launch more.”⁶² In other words, Viasat argues that SpaceX would spend billions of dollars to deploy a technologically advanced NGSO satellite system capable of generating tens of billions of dollars per year in revenue yet blithely ignore the existential risk to that mammoth investment posed by

⁵⁹ *See id.* at 21, 24.

⁶⁰ *See* 47 C.F.R. § 1.1307(b).

⁶¹ *See* Viasat Petition at 23.

⁶² *Id.* at 25-26.

orbital debris at its operational altitudes. Such an argument is completely untethered from reality and nonsensical on its face. Moreover, it ignores the fact that SpaceX seeks to relocate the rest of its satellites to lower altitudes precisely because doing so will dramatically improve the orbital debris environment in which it would operate. The Commission should reject Viasat's insinuations that SpaceX would not be motivated to prevent orbital debris.

In contrast, Viasat attempts to claim the mantle of “environmentally conscious” operator while simultaneously proposing to launch 14 times more satellites to a much riskier orbit yet presenting less information about the safety profile of its system—and explicitly asking to reserve its right to modify its system in the future to make it *less safe*.⁶³ And until a recent about face, it even argued that non-U.S. licensed systems such as its own should be exempt from Commission oversight. There should be little doubt as to which operator is more concerned about taking measures to reduce its orbital debris profile.

D. The Proposed Modification Will Not Change the Number of Satellites Launched or Deorbited by SpaceX or Their Potential Environmental Effects

1. The Proposed Modification Will Not Increase the Number of SpaceX Satellites

SpaceX is currently authorized to launch and operate 2,825 satellites at altitudes above 1,100 km. Under the modification, it would launch and operate 2,824 satellites at altitudes from 540-570 km. In both cases, the satellites have an expected useful lifetime of approximately five years, after which SpaceX will actively deorbit them by using propulsion to reduce perigee to approximately 300 km, from which point they will passively demise in the atmosphere in a matter of weeks or months. Thus, in either case, SpaceX would launch, operate, and deorbit essentially the same number of satellites over the term of its license (actually, one fewer under the

⁶³ Viasat Application, Technical Annex at 6 (Viasat “reserves the right modify this orbital debris mitigation plan to incorporate any less-stringent requirements” adopted by the Commission).

modification). Accordingly, contrary to Viasat’s assertion, granting the proposed modification is not the same as “permitting the launch and decay of at least 10,000 low-Earth-orbit satellites within the span of less than two decades.”⁶⁴

A primary benefit of operating at the lower altitude is the fact that any satellites that SpaceX is unable to actively deorbit would *passively* deorbit in a few years from 540-570 km altitude as compared to the centuries it would take from altitudes above 1,100 km. But Viasat attempts to conflate the active deorbit planned for the vast majority of SpaceX satellites with the passive deorbit that would only apply to non-propulsive satellites to claim that “reduction in orbital altitude would dramatically accelerate the time period within which many thousands of its satellites would burn up in the Earth’s atmosphere.”⁶⁵

This is a blatant mischaracterization of SpaceX’s application. SpaceX intends to launch and deorbit a slightly smaller number of satellites under the proposed modification than under its existing authorization—an orderly process during which SpaceX will control the ascent and descent of its satellites on a regularized timetable. The fact that any small number of satellites that become non-propulsive will demise in the atmosphere faster from the proposed lower altitudes has no effect whatsoever on the pace at which SpaceX satellites will be actively deorbited. The Commission should reject Viasat’s cynical effort at misdirection.

Without this mischaracterization, Viasat’s arguments about the effects of launching and deorbiting satellites on the environment disappear. Granting the modification would not increase the number of launches compared to deployment of SpaceX’s currently authorized system. The same is true for deorbiting satellites, since the number will be essentially the same under both the

⁶⁴ Viasat Petition at 10.

⁶⁵ *Id.* at 9.

modification and the existing authorization. Accordingly, grant of the modification would not change the status quo and therefore would not have any discernable effect on the atmosphere.

It is also worth noting that the Federal Aviation Administration (“FAA”) licenses all U.S. launch vehicles and U.S. launch sites—and has its own rigorous NEPA evaluation associated with that process.⁶⁶ Because SpaceX launches all of its satellites on U.S. rockets from U.S. soil, all launches associated with its constellation undergo NEPA analysis by the FAA. Most foreign licensees—such as Viasat—deploy their satellites from launch sites outside the U.S. and therefore their launches and launch vehicles do not undergo the same evaluation of environmental effects.⁶⁷ In these circumstances, it is ironic (though not surprising) that Viasat would raise an environmental concern that it managed to avoid for its own system by licensing and launching outside the U.S.

2. SpaceX Satellites Will Fully Demise in the Atmosphere, Rendering Viasat’s Musings About Potential Effects on Aircraft and the Earth’s Surface Entirely Irrelevant

Viasat devotes three pages of its Petition to a discussion of the potential risks for aircraft impacts, human casualty, and terrestrial pollution from pieces of SpaceX satellites that survive atmospheric reentry.⁶⁸ It is not until the third page that Viasat bothers to acknowledge that SpaceX “expects its satellites to completely burn up in the atmosphere”⁶⁹—a fact that renders the rest of its musings on this topic totally irrelevant.

Viasat tries to disregard this fact by arguing that “the Commission cannot take [SpaceX’s] assertion at face value,” and instead must take a “hard look” at whether satellite debris will have

⁶⁶ See 14 C.F.R. § 413.3(a); FAA Order 1050.1F, Environmental Impacts: Policies and Procedures (July 16, 2015), https://www.faa.gov/documentLibrary/media/Order/FAA_Order_1050_1F.pdf.

⁶⁷ For example, Viasat launched its first satellite from Kazakhstan on a Russian rocket and its second from French Guiana on a European rocket. See Viasat, *Viasat’s Growing Fleet of Satellites*, VIASAT | EXEDE, <https://www.exede.com/viasat-satellite-internet-service/>.

⁶⁸ See Viasat Petition at 13-16.

⁶⁹ *Id.* at 15.

an environmental effect on the Earth's surface.⁷⁰ That argument totally ignores the fact that the Commission has already taken a very hard look at satellite demise issues in promulgating its orbital debris mitigation rules. Specifically, the Commission has endorsed the use of NASA's DAS to determine whether NGSO satellites will completely demise in the atmosphere and whether they present any risk of human casualty.⁷¹ SpaceX used DAS to determine that it had successfully designed its satellites for total atmospheric demise. Although Viasat has raised many orbital debris challenges to SpaceX's modification, it has not challenged this demise determination. The fact that Viasat has finally resorted to NEPA in an effort to have the Commission simply ignore its own orbital debris mitigation determinations strongly indicates that Viasat knows its orbital debris arguments to date are baseless and not likely to succeed.

The Commission is currently considering whether to require all NGSO systems to implement a design-for-demise approach under which no satellite remnants would survive atmospheric reentry.⁷² SpaceX heartily endorsed such a rule,⁷³ while Viasat did not. Here again, there should be no doubt as to which operator is more committed to reducing potential environmental effects.

CONCLUSION

Viasat presents absolutely no basis for deferring or denying SpaceX's modification application based on environmental considerations. Operating at a lower altitude will actually shrink SpaceX's environmental footprint, ameliorating many of the concerns cited in Viasat's Petition—unlike Viasat's own pending application that instead proposes to launch hundreds more

⁷⁰ *Id.*

⁷¹ *See Orbital Debris Mitigation Update Order* ¶¶ 118-121 and new Section 25.114(d)(14)(vii)(D)(2)(b).

⁷² *See id.* ¶¶ 173-74.

⁷³ *See Further Comments of Space Exploration Technologies Corp.*, IB Docket No. 18-313, at 14-15 (Oct. 9, 2020).

satellites at higher orbits where they will create increased risks of debris that would persist for generations to come and where reflectivity is a substantial issue. Accordingly, the Commission should deny the Petition and grant SpaceX's application so that SpaceX can proceed with its plans for expedited deployment of its NGSO constellation and provide improved high-throughput, low-latency broadband service to American users.

Respectfully submitted,

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